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Strength of Passalus cornutus Fab.

By W. E. HINDS, B.S.

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It is generally believed that insects possess tremendous strength in proportion to their size. This belief rests largely upon casual observations of applications of strength so striking as to command attention. The true value of such observations can, however, seldom be determined, because the observer has taken no pains to accurately measure the strength exerted, and it is difficult to estimate it closely. We are indebted to European entomologists for the few facts which have been recorded upon this subject, as no record has been found of any experiments in this line by American writers—a somewhat remarkable fact since the field is so full of novelty and interest.

The experiments here recorded were first suggested by the very prominent horn upon the head of *Passalus cornutus* Fab. (Fig. 1), and though the work was begun as an interesting novelty, the results obtained soon showed the possibility of an extended series of experiments, and this article is written with

the hope that the facts here recorded may not only add something to our knowledge of insect strength, but also suggest work in similar lines with other insects.

Although the horn first suggested the idea of harnessing this beetle, it was soon found that this appendage did not lend itself to the purpose of these experiments as readily as had been anticipated, so no use was made of it in the trials recorded. These trials may be divided into seven principal groups as follows:

1. Power exerted by the beetles while crawling along a horizontal cork surface, measured by the extension of a spring to which the beetle was attached (Fig. 2).

2. The same experiment repeated, except that a chip of wood taken from one of the burrows was used in place of the cork.

3. The beetle was allowed to crawl into an artificial burrow formed by fastening a sheet of cork above a piece of wood taken from a burrow at the average vertical height of the burrows (Fig. 3). This gave the most natural conditions for the pull.

4. Power exerted when climbing a vertical surface of rough wood. This was measured in two ways which gave no apparent difference in results; *a*. By the extension of a spring, the thread attached to the beetle turning 90° around a pulley (Fig. 4); *b*. By loading the weights upon a platform suspended directly from the beetle.

5. Power exerted in lifting a weight by straightening the legs so as to clear the ventral surface of the body from the surface on which it rested.

6. Power exerted in lifting a weight by the head and pro-thoracic muscles, the hinder part of the body being firmly fastened in such a position that the insect could touch nothing with its legs (Fig. 5).

7. A repetition of the sixth experiment with the addition of an opportunity for the insect to brace its forelegs so as to assist in the lift.

In all cases the strength exerted in moving or lifting a load was measured in terms of weight, determined by different devices as explained under each experiment. Two methods of determing these weights were used: first, by measuring the extension of a spring and then finding the weight in grams which would produce the same extension; second, by adding weights to a small, light platform suspended directly from the beetle. In this article the weight in grams equivalent to the strength actually exerted is given first, followed by figures in parenthesis showing the ratio of the weight actually moved or lifted to the weight of the insect.

Two series of six beetles each were put through each of these seven experiments. Each beetle was weighed and measured, the length being taken from the tip of mandibles to the tip of abdomen, and the breadth at the middle of the wing-covers. The first six beetles were allowed a rest of twenty-four or more hours between each experiment, and their weights were taken every fourth day. The second six were more carefully weighed, put through the experiments in quick succession and immediately weighed again. The loss of weight was thus found, to see if any constant relation existed between the weight lost and the work done. Two beetles were kept as checks upon these loss of weight experiments.

In the first three experiments the device shown in Fig. 2 was used for measuring the strength of the beetles. A watch spring was selected of such size that it could be used to measure any tension from one-tenth of a gram to over two hundred grams, and straightened somewhat so as to form a single loop. One end of the spring was securely clasped to a board by means of a screw through a small washer; the other end was bent into a hook so as to hold the thread by which the beetle pulled. A knot tied in the thread a short distance from the hook formed a mark which could be easily followed with the eye, and by placing a millimeter scale in line with the spring and beyond the knot in the thread an easy means was obtained of accurately measuring the elongation of the spring when subjected to a pull. The thread from the spring was passed forward below the body of the beetle between the middle and hind legs and tied around the pro-mesothoracic constriction. The beetles appeared very willing to exhibit their strength, and as soon as they found themselves attached they would endeavor to escape, showing a decided tendency to travel straight toward the window.

During the pull more strain seemed to be exerted upon the apical tibial spurs, which are well developed upon all the legs, than upon the tarsal claws, of which only the fore pair appeared to be of any considerable assistance. It was found that the rough surface of the wood (as the beetles had left it upon the excavation of their burrows) afforded so much more favorable

footing than the cork that they could pull approximately one-sixth more upon the former than upon the latter. The average pull in experiment 1 was 17.725 grams (17.07:1); while that in experiment 2 averaged 20.417 grams (19.66:1).

But it was in experiment 3, when pulling under the conditions most closely approaching those in which they are usually found, that these beetles performed their most astonishing feats of strength. Their average pull in this case was 164.83 grams (158.73:1); while the maximum pull was 232. grams (211.0:1).

Experiment 4 was made to find the strength of the tarsi and the ability of the beetles to climb with a weight (Fig. 4). The individuals showed considerable variation in this respect, some being able to climb with twice the weight that would pull another down. The tarsi are slender, comparatively weak and evidently not adapted to such work; still the beetles showed themselves able to climb with an additional burden of ten times their weight.

It was noticed that the insects could crawl from under what seemed to be an almost crushed weight, so experiment 5 was performed to determine their power to lift weights upon their backs. The thread fastened around the pro-mesothoracic constriction as before was passed down through a slit cut in a piece of cork, upon which the beetle stood and attached either to the platform to receive the weights or to the spring previously described. Although laboring under the decided disadvantage of having the weight suspended from the most slender part of their bodies, they still cleared their abdomens from the cork while lifting a weight of 104.67 grams (100.781:1).

In a single trial one specimen succeeded in crawling along a sheet of cork with a weight of 700 grams placed upon a small platform upon its back; but 750 grams held it still. These weights seem sufficiently enormous to crush the little creature, although the beetle used showed no ill effects from the great pressure. The ability of these insects to support such weights is undoubtedly due to the unusual hardness of their exoskeleton: a character in which there exists wide variation, however, within the limits of this species.

The last experiments—6 and 7—were suggested by the ten-

dency which the beetles showed to lift by their heads, obstacles under which they desired to crawl. In each experiment the beetles were suspended horizontally from the clamp upon a ring-stand by the tip of the abdomen and the pro-mesothoracic constriction (Fig. 5). In experiment 6 they were not allowed to touch anything with their legs. The platform upon which the weights were placed was suspended directly from the head, the thread being fasted around the head just behind the eyes and the horn, the height of the beetle being adjusted by the clamp, so that when the head was lowered the platform would rest upon the base of the stand. Weights were then added as long as the beetle was able to lift the platform clear of the stand. In this way, by the pro-mesothoracic muscles alone, the weight lifted averaged 36.83 grams (35.41:1).

The 7th experiment was performed under the same conditions as the 6th, except that an opportunity was given the beetles to use their forelegs by bracing them upon a piece of cork adjusted to the correct height by another clamp upon the ring-stand. This additional condition increased their lifting power to an average of 127.5 grams (122.79:1). This experiment shows great power in the forelegs.

A single trial was made with one beetle to get an idea of what the strength exerted in pulling would mean if measured in the usual way as drawing a load. The "cart" consisted of a pane of glass moving freely upon four ¼-inch steel balls placed on top of the table. The beetle, pulling upon a cork surface as in experiment 1, was harnessed to the glass loaded with weights. The table top was not perfectly horizontal, as was shown by the "cart" moving more easily in one direction than in the other, but this inclination was not sufficient to continue the motion of the load after it was started down it. The beetle was, however, made to pull its load up this slight inclination, and thus, with the conditions rather against it, the beetle succeeded in pulling the apparently enormous load of 1250 grams (1116:1). When given the additional advantage of pulling under the more natural conditions of its burrow, the same beetle easily pulled a load of 3214 grams (2870:1). While the last figures are astonishing, they give a

less exact idea of the real strength exerted by the insect than do the preceding figures. The average dimensions of the sexes, obtained from measurements of four males and four females that were used in the experiments, were as follows: Length, males, 3.115 cm.; females, 3.32 cm.; breadth, males, 1.065 cm.; females, 1.14 cm.

The average weight of all the specimens used during all of the experiments was found to be 1.0384 grams.

The six beetles put through all of the experiments continuously lost an average of 2.89 per cent. of their weight during the time of the work; while the two beetles used as checks lost only .62 per cent. in the same time. Still no relation could be seen between the percentage of weight lost and the amount of work done.

No secondary sexual characters were found which could be relied upon to distinguish the sexes, but upon dissection of eleven of the beetles used it was found that seven were males and four were female. While the largest beetles were females and the smallest were males, those of medium size might be of either sex.

When subjected to interference or restraint, the insects, both males and females, produced a sharp, intermittent, hissing stridulation.

In closing, I wish to express my thanks to Professor C. H. Fernald and Dr. H. T. Fernald for their encouragement and assistance in the preparation of this paper.

EXPLANATION OF PLATE X.

1. Dorsal view of *Passalus cornutus* Fab., natural size.
2. Apparatus used in experiment 1.
3. The artificial burrow used in experiment 3.
4. Apparatus used in experiment 4.
5. Apparatus used in experiment 6.

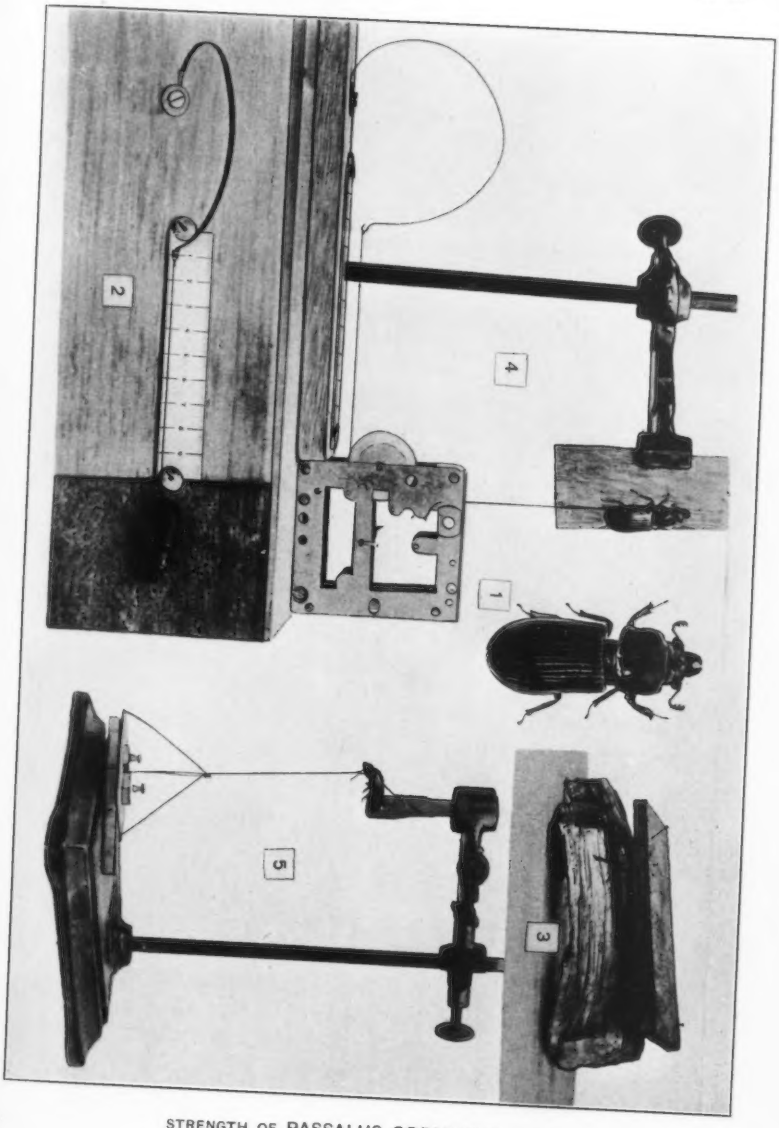
"Em'nent foreign scientists have found out that a grasshopper's ears are in its legs."

"How did they ascertain that?"

"They put the 'hopper' on a board and tapped the board gently."

"The creature hopped away. Then they cut off its legs, put it on a board again, and tapped the board as before, and it didn't hop away. It couldn't hear the tap, you see."

"What a wonderful thing science is."—*Chicago Tribune.*



STRENGTH OF PASSALUS CORNUTUS (HINDS).

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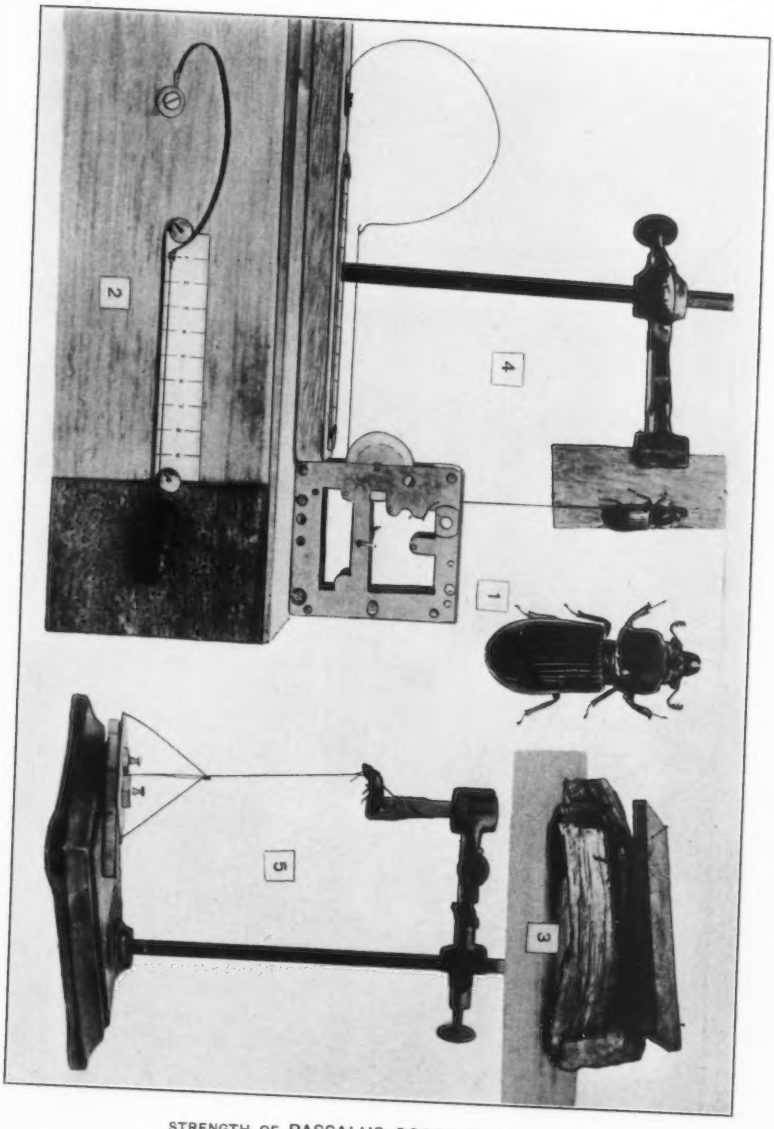


STRENGTH OF PASSALUS CORNUTUS (HINDS).

Pupa of Necrophilus hydrophiloides.

F. E. BLAISDELL, M.D., San Francisco, California.

Family SILPHIDÆ.

Order COLEOPTERA.

Length 9 mm.; width 5 mm.—Ovate, slightly elongate; head flexed upon mesosternum; abdomen depressed and curved ventrally; color creamy white; appendages and expanded pronotal margins semi-translucent; eyes castaneous. Head entirely hidden by pronotum when viewed from above; interocular region just perceptibly convex, smooth, marked with slight depressions; maxillary palpi reaching nearly to posterior borders of middle coxæ. Antennæ curving backwards, first two joints passing around lower border of eyes, succeeding joints passing along sides of prothorax, curving over distal ends of anterior and middle femora, last two joints becoming visible beneath posterior angles of pronotum and between middle tibio-femoral joints and humeri. Pronotum evenly convex from side to side; basal angles rounded; base truncate in circular arc; sides convergent anteriorly; apex feebly sinuate, with angles broadly rounded; sides explanate. Anterior coxæ hidden beneath mouth parts; anterior crura with tibio-femoral joints just beneath and posterior to middle of pronotal margins; distal extremities of tibiæ against and not extending beyond lobes of maxillæ; tarsi slightly converging to opposite middle of posterior coxæ. Mesonotum with disc evenly convex throughout; slightly opaque. Middle coxæ visible between basal joints of anterior tarsi. Middle crura flexed against sides of body and in close relation to the anterior crura; distal extremities of femora opposite to middle of posterior third of pronotal margins, extending slightly beyond; distal extremities of tibiæ distant from each other and opposite middle of metasternum laterally; tarsi converging posteriorly, not coming in contact and resting against lateral margins of wing-pads, with ungual joints over distal extremities of posterior tibiæ. Elytral pads embracing sides of body ventrally, resting upon alar pads; discal surface with the impressed striæ and convex intervals evident. Metanotum evenly convex throughout, smooth and shining, about equal in length to mesonotum. Alar pads nearly overlapped by the elytral; basal angles being visible at middle of sutural margin of elytral pads; apical one-third uncovered, reaching posteriorly to middle of hind tarsi and external to them. Posterior coxæ visible between middle tarsi. Posterior crura flexed and closely embracing sides of body; tibio-femoral joints opposite to interval between second and third abdominal segments, extending outwards a short distance from beneath elytral pads; proximal portions of femora and nearly all of tibiæ being hidden beneath alar pads; distal tips of tibiæ visible mesially, spurs nearly touching each other in middle line. Posterior tarsi separated by a small triangular space at their basal thirds, parallel, and in contact for dis-

tal two-thirds, reaching to near tips of anal appendages. Abdominal segments convex dorsally, ventrally less so ; pleural regions of segments one to eight inclusive produced into conical tubercles, tipped with chitin, each bearing a moderately long, evenly recurved seta. Tubercles limited dorsally by a longitudinal depression on either side of dorsum, beginning on first segment and terminating on seventh. Ventrally the depressions are less strongly developed. The lateral tubercles on first and second segments each bear a spiracle on their dorsal surface. Ninth segment without tubercles, but support two caudal appendages, which are cylindro-conical, each tipped with a long spine, which curves inwards and ventrally. Anal segment terminates in two short contiguous, conical processes, each tipped with chitin. Apical margin of pronotum at either side of middle fifth bears a small chitinous tubercle, each supporting a long double curved corneous spine, both together resembling the sides of a lyre. Pronotum fringed with a submarginal row of recurved chitinous setæ. Dorsally the posterior borders of segments 5, 6, 7 and 8 fringed with a single row of slender setæ, which become advanced on segments 2 and 3, while on the first segment they approach the centre. On metanotum the transverse row is interrupted at middle, with a few irregularly placed setæ on either side of centre of disc. Central area of mesonotum bears a number of fine erect delicate hairs.

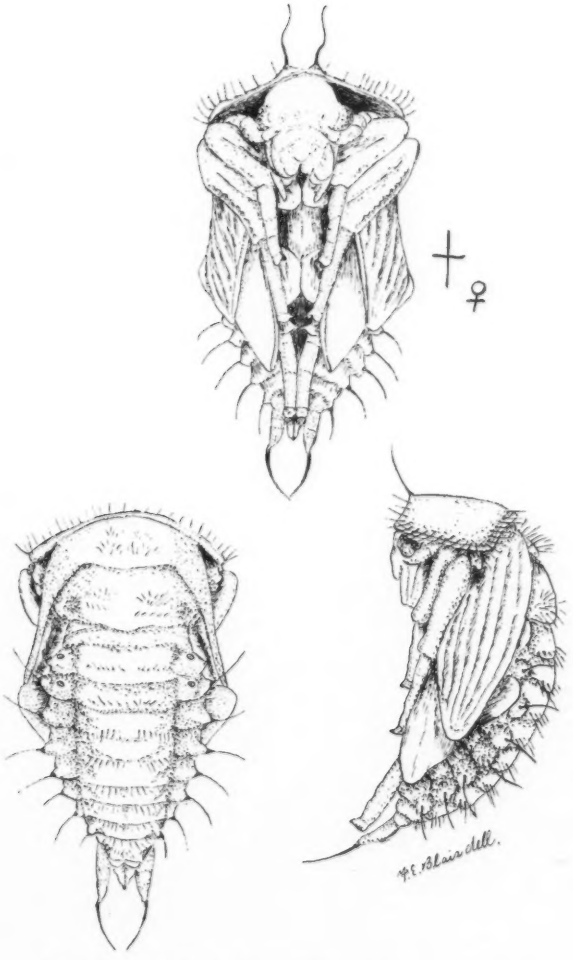
Described from the pupa of a ♀ taken from beneath an old water-trough in low, damp, marshy ground, at the Presido, San Francisco, California. Collected January 1, 1901.

The pupa was about one-half inch below the surface of the ground, in a delicate earthy cell hollowed out in soft light loam. Many imagos were about at the time. The drawings accompanying this article show all of the characters mentioned in this description.

New Lepidoptera from Bolivia.

By A. G. Weeks, Jr.

Hymenitis andreas sp. nov.—Head black, with four white specks on "collar." Also a white speck at each eye and two others at junction of each antennæ. Thorax and abdomen above nearly black ; below nearly white. Antennæ black. Legs black, grayish underneath. Forewings transparent, with a greenish blue lustre, as is prevalent in species of this genus. The inner marginal area is black. The costa is black, and at end of discoidal space the black extends downwards to a point at lower end of discoidal space, this black triangle being nearly a quarter inch wide on its costal edge. Outside of this is a band of white scales running from costa downwards across end of discoidal space and terminating next to



PUPA OF NECROPHILUS HYDROPHILOIDES (BLAISDELL).

the lowest submedian nervule. The black of the costa broadens to a sixteenth inch in width outside the white band, turning at apex and continuing downwards along hind margin and joining the black of the inner marginal area at lower angle. At the lower angle, in interspace above the lowest submedian nervule, there is a mere suggestion of a dash of white scales. The nervures and nervules are all black. Upper side of hind wings transparent, with lustre as above noted. Costal area black. Hind margin with a black border one-sixteenth inch wide, lessening and dwindling to a thread towards submedian nervure. At apical angle there is a very slight, light brownish dot. The underside of forewings is identical with upper surface, except that the black portions are reddish brown, bordered by a darkish thread. The inner marginal area, however, is black. There is also a suggestion of three interspacial white dots at apex. Underside of hind wings is the same as upper surface, except that the black portions are reddish brown, bordered on the basal side by a black thread. The hind margin, also, has a black thread at its edge. The brown spot at upper angle on forewings is white on the under surface. Expanse 1.90 inches.

Hab.—Bolivia, five days' travel north from Cochabamba.

Described from seventeen specimens taken September 12, 1899. A duplicate has been found in a European collection, taken also in Bolivia, but unnamed.

Thecla infrequens sp. nov.—Head, thorax and abdomen above blackish, covered with blue-gray hairs; beneath light grayish brown. Antennæ black, with white annulations at the base of each joint. Club black. Legs light grayish brown. Upper side of forewings bronzy brown, with some lustre. There is an indistinct large discoidal spot of blackish. Basal area in certain lights seems brighter than rest of wing. Hind margin has a slight fringe, lighter than ground color. Hindwings same color, excepting lower half, which is light purplish blue. The edge of this blue area is bounded by a line drawn from base along subcostal nervure to centre of wing, then downwards to median nervure and following that to hind margin. Hind margin has fringe as on forewings. The purplish blue area is broken as it reaches hind margin by interspacial lunules of ground color. Inner marginal space light gray. Underside of forewing light soft brown. Hind margin has a dark thread within the fringe. Beginning at costa, one quarter distance from apex to base, and extending downwards to lower submedian nervule, is a line of interspacial dark brown spots suffusing towards the base of wing. There is a slight space of ground color outside of these spots, followed by a white line running from apex downwards to submedian nervure, parallel to hind margin, and one-sixteenth inch within it. The space between this and hind margin is dark brown. Inner marginal space light gray. General ground color of hind wings, underneath, is a rich dark brown. Basal area is somewhat lighter, but with a

dark brown spot near costa. Outside of this spot is a dash of whitish scales. Running from apex across to inner margin, near its base, following contour of hind margin, is an irregular dark brown line. Outside of this line the ground color lightens, being very light at hind margin, dashed with whitish scales and showing a few indistinct interspacial dark lines. The fringe of hind margin is nearly white. Expanse .90 inch.

Hab.—Bolivia, near Cusilluni.

Taken in May, 1899. Described from three specimens in my collection.

Thecla dickiei sp. nov.—Head and eyes black. Antennæ black, with white annulations at the base of each joint. Club black, with orange tip. Thorax above covered with blue-gray hairs; below grayish brown. Abdomen blackish above, grayish brownish beneath. Legs black, with white annulations at ends and centre of each joint. General color of wings above nearly black. The upperside of forewings is entirely black, including costa, except a brilliant dash of lustrous blue within a line drawn from base through centre of discoidal space, then turning downwards to inner margin. The blue occupies about one-third of wing area. The lower wings are black, with the brilliant blue space of forewings repeated, but covering only the basal quarter of the wing and not encroaching on inner marginal space. Extending from the end of lower median nervule is a delicate tail, black, with a white tip, about one-eighth inch long, and from the nervule next above another, one-sixteenth inch long, with a white tip. At anal angle is a small dot of rust color. The hind margin is edged with a fine black thread. Both hind margins bear a slight fringe of gray-brown hairs. The ground color of underside is a dead grayish brown. One-sixteenth inch within hind margin of forewing is an indistinct whitish line running downwards from about the third subcostal nervule to the inner margin, bordered on the outside by an indistinct line of dark grayish brown. Another and prominent white line runs from costa (at a point one-third distance from apex to base) downwards to the lowest median nervule. This line is distinctly edged with black on basal side, and forms the most prominent feature of the wing. Starting from lowest submedian nervule, one-sixteenth inch inwards from end of line just described, is another similar line running to inner margin. There is also a linear white dash across outer border of discoidal space. The prominent white line of forewings extends downwards through the hind wing to the lower median nervule, and thence jaggedly to inner margin, forming a **W** in anal angle area. The marginal indistinct white line of forewings also extends through hind wing, swerving inwards at lower portion and joining the first mentioned line at the lower median nervule. Below this point of juncture, in the interspace, is a prominent rust-colored spot, with a black speck at its lower edge. At the anal angle is a black spot with an adjoining semi-circle of white above it, and above that a semi-circle of rust color, which extends upwards along inner margin. The border of hind

margin, for one-sixteenth inch inwards, is dusted with light brownish scales. There is a whitish indistinct line across outer border of discoidal space. Expanse 1 inch.

Hab.—Bolivia, near Coroico.

Taken by Mr. Gerhard in May, 1899.

Pamphila cusilluna sp. nov.—Head and palpi above dark brown; beneath brownish gray. Antennæ black, lighter beneath. Club black, with lighter tip; beneath grayish. Thorax dark brown. Abdomen dark brown above, light brown beneath. Upperside of both wings dark bronzy brown, with some lustre. The discoidal space of forewings has an indistinct longitudinal blackish dash. Hind margins have a slight fringe of hairs, of ground color. On underside of forewings the marginal fringe is dark brown from apex to centre of wing, and from that point to lower angle it is grayish. On costa, one-sixteenth inch from apex, is a small white spot, and in interspace below it another one, both being practically at the very apex. Below these are a series of interspacial dark rust-colored dashes, ending at central portion of the hind margin, most prominent near apex, the apical area consequently appearing rust colored. Within these, and starting at apical white spots, is a triangular space, heavily dashed with white scales. The inner two-thirds of the wing is dark blackish brown. The ground color of underside of hind wings is rich brown, with a suffusing band of white. This band, with its basal side on a line drawn from centre of costa to near the joint on inner margin, is pure white, suffusing towards hind margin. It forms the prominent feature of the underside markings. Expanse 1.12 inches.

Hab.—Bolivia, near Cusilluni.

Taken in May, 1899. I have placed it in the genus *Pamphila*, rather than to introduce a new genus, which, however, seems warranted.

The Proper Names of Certain Genera of Hymenoptera.

By William J. Fox.

The prior use by Schneider* of the term *Pompilus* for a genus of cuttle-fishes makes it necessary to adopt another name for the long-established genus of wasps, *Pompilus* Fabricius. The latter was described in 1798, and included then thirty-seven species. By elimination the included species are

* *Sammlung vermischter Abhandlungen der Zoologie und der Handlungsgeschichte von Johann Gottlob Schneider, 1784.*

P. viaticus (L.) Fabricius, *P. Gibbus* Fabr., and *P. pulcher* Fabr. [*P. plumbeus* Fabr.], the selected type being *P. viaticus*.

In view of the necessity of adopting the first of the subgeneric terms subsequently applied to species of *Pompilus* Fabr., it is at once evident that the type of that subgenus becomes the type of the collective genus, and *Pompilus viaticus* is thereby removed from further consideration as a generic or subgeneric type.

From the facts at hand, *Aporus* Spinola (1808) supersedes *Pompilus* Fabricius, and the type of the genus becomes *Aporus unicolor* Spinola.

Anoplius Dufour (1833), being synonymous with *Pompilus* Fabricius, may be resurrected and used in a subgeneric sense for typical *Pompilus* Fabricius, with *Anoplius nigerrimus* (Scopali) [*Pompilus niger* Fabricius] as the type. Dufour became authority for *Anoplius* inadvertently; for having received from Lepeletier de St. Fargeau specimens labelled *Anoplius niger*, "et d'autres species," with that generic application, thereby presuming it had already been described,* he indicates, as the type of *Anoplius*, the *Pompilus niger* Fabricius. Lepeletier de St. Fargeau did not describe the genus until 1845. This incident shows one of the disadvantages of disseminating manuscript names—a practice even now too much in vogue.

The relegation of the term *Pompilus* requires that another family name replace the term Pompilidæ, and, basing the new name on the first-described genus, *Ceropales* Latreille (1796), the family name should henceforth stand as Ceropalidæ. Ashmead has already called attention to the fact that *Ceropales* Latreille antedates *Pompilus* Fabr., but, from sentiment, does nor adopt Ceropalidæ. Strict adherence to priority is the only means by which zoological nomenclature will become stable.

Salius Schranck (*Fauna Boica*, I, 1798) has priority over *Salius* Fabricius (*Syst. Piez*, 1804), the former being a genus of beetles. The type of *Salius* Fabricius is *S. bicolor* Fabricius.

The name adaptable for *Salius* Fabricius is *Cryptocheilus* Panzer (*Krit. Rev. Insekt. Deutschl.*, II, 120, 1806), the type being *Cryptocheilus annulatus* (Fabr.) Panzer.

* See *Annales Soc. Ent. France, II, 483, 1833.*

Guerin's genus *Tachypterus* has been generally called *Trachypterus*. The former is the original spelling, and should not have been emended. Moreover, such emendation in this case would require that Guerin's term be dropped, as *Trachypterus* Gouan (1770) would have priority.

Monedula Latreille (1804) is preoccupied by *Monedula* Hasselquist (1762). Illiger (in *Rossius, Fauna Etrusca*, vol. 2, 1807) was aware of the prior use of the term in Ornithology, and proposed the name *Stictia* to replace *Monedula* Latreille. Illiger's term should be therefore adopted for this genus.

Monedula has sometimes been credited to Coquebert (1798), but this is an error.

Contributions to the Odonata of Maine.—IV.

By (the late) F. L. HARVEY, Orono, Me.

(Continued from page 243.)

71. **Ophiogomphus johannus** Needham.

We took two males of this species at Chemo stream, Bradley, Me., July 4 and 11, 1899. They were flying over swift water and alighting on rocks projecting above the water. No females were seen. The original description was drawn up from a single teneral male. Our specimens are mature and in full color. We are able to add the following notes:

Thorax grass green. The median dorsal fuscous stripe is apparent the whole length of the carina and broader *anteriorly*. The humeral and antehumeral stripes *not* fused, but separated the whole length in one specimen and only slightly fused at the posteror end on one side of the other. The antehumeral stripe broadest anteriorly narrowing backwards to a point, separated from the humeral by a green stripe of its own width. Sides of thorax grass green above and paler toward the base of the legs. Wings slightly smoky. The appendages agree closely with Needham's description and figures, excepting that the lateral tooth on the lower appendage is more prominent, and the tip of the superior, in profile, is transversely notched showing in side view an inferior and a superior tooth, the latter longer.

We have a single female *Ophiogomphus* taken behind the town building in Orono, June 16, 1898, by my daughter, Florence Harvey. It is different from the females of *O. ano-*

malus, *aspersus*, *carolus* and *rupinsulensis*, species of which the males have been taken in Maine. As we have also taken *O. johannus* about Orono, this specimen may prove to be the undescribed female of that species.

[I have examined this female carefully, and have compared it with a female *carolus* given me by Prof. Needham. I can find no differences except that the pale colors of the former on head and thorax are bright green, and that the yellow spots on the sides of 2–7 are somewhat larger. Of course it may still be the female of *O. johannus*.—P. P. CALVERT.]

25. **Gomphus nævius** Hagen.

This species proves to be fairly abundant at the original locality, we having taken about seventy-five specimens in the last three years. Females are scarce; few are seen and only half a dozen have been taken. They fly much more swiftly and irregularly than the males, darting about over the pool ovipositing here and there, and in a moment are gone into the bushes. The species is apparently local, having never been taken on any other stream, although we have seen at Sunk Haze and Birch streams, Greenfield, what we supposed was this form.

42. **G. brevis** Hagen.

An abundant species. About forty specimens were taken in June at the locality spoken of under *O. anomalus* in this article. Later an occasional male was taken over Chemo stream, Bradley. We have no idea when the eggs are laid.

62. **Gomphus scudderi** Selys.

Between August 24, and 29, 1899, we made a special trip to Russell Stream, near Northeast Carry, Maine, to collect this species. It was at this locality that in 1897 we took the single male from which our description was drawn up. We followed the stream up and down for two miles, several times a day, for two days, and succeeded in taking about fifty specimens, nearly all males, but one pair *in coitu*. From the additional material we are able to make the following notes: The length varies from 53 to 59 mm. The male taken *in coitu* and several others lack the spot on the base of the dorsum of 9; in others it is

smaller than indicated in our original description and figure, while in several others it agrees with that account. The spot on the side of 9 sometimes lacks the tail.

Russell Stream, excepting near the mouth, has numerous sandy beaches, bars and low grassy islands just above low water mark. On these the *Scudderi* alight close to the water's edge, in the middle of the day, but, toward evening, they settle on the low bushes on the sunny side of the stream. They are wary and hard to approach. By scaring them away, crouching near their favorite alighting place and waiting, they would return and were taken by dropping the net over them. The females were scarce; those seen were ovipositing in swift shallow water with a pebbly bottom, or flying over the stream. They would dart out of the bushes, make a dive for the water, dip the abdomen down two or three times in quick succession, then fly into the bushes usually out of reach. One female came buzzing about our head and was captured and the pair *in coitu* came in reach of the net while flying by. Associated with the above were *O. rupinsulensis*, *Boyeria venosa* and *Aeschna constricta*, the latter in great numbers.

72. **Dromogomphus spinosus** Selys.

A single male taken August 16, 1899, at Pushaw Pond, Old Town, Maine. Some alighted on a large rock by a sandy beach (Harvey).

Subfamily 4, CORDULEGASTERINÆ.

73. **Cordulegaster (Tæniogaster) obliqua** Say.

♂ Total length 70 mm., abdomen 54 mm., hind wing 44 mm., alar expanse 93 mm. Occiput yellow, quadrangular, one of the angles making the highest central point; a dark cluster of black hairs at the base next the eye, at the base behind a median dark spot. Frons yellow, bordered with brown near the post-clypeus and at the sides near the eyes. Post-clypeus yellow, ante-clypeus pale brown with a small yellow spot on each side near the outer edge. Labrum yellow, bordered narrowly with brown and a narrow line of brown extending nearly to the middle from above. Base of mandibles yellow, remainder dark brown or black. Other mouth parts pale brown. Next to the occiput bordering the eye as far as the middle a black band. Remainder of back of head brown.

Thorax brown. Antehumeral stripe yellow, cuneiform, the point anterior. These stripes are crossed by a few pale brown veins. Sides with two yellow

bands, edged with black stripes, located on mesothorax and metathorax opposite to the bases of the wings. A yellow spot at base of second pair of legs. Yellow spot on dorsum between fore-wings and twin spot between base of hind wings.

Legs black, except bases of femora, which are brown.

Abdomen brown at the base but gradually changeing to black toward the apex. Gradually widening from 3 to 8, but not conspicuously dilated as in *C. maculatus*. Yellow spots on the dorsum of 1–9, that on 1 a transverse band, those on 2–8 sagittal, the points caudad. The spots on 2 and 3 extending the whole length of the dorsum, the others basal and gradually shortening. The one on 8 broader and with a blunt point. The spot on 9 quadrangular, brighter yellow, nearly half the length of the segment. The tenth segment entirely black. Dorsum of abdomen covered with black granules which show conspicuously on the dorsal spots. There is a little yellow on the sides of segments 1–3 near the ventral suture, and the auricles are pale. No other markings on the sides of the segments. There is a twin yellow spot on the base of venter of 8 and sometimes lighter ventral areas on 8–9.

Appendages black; the superiors about the length of 10, divergent, trigonal, a basal tooth beneath, the terminal fourth abruptly narrowing to the acute apex, appearing obliquely truncate. Inferior appendages quadrangular, tuberculate above at the outer angles, slightly emarginate at the apex, thickened at the end, in side view appearing obovate.

♀ Total length 78 mm., abdomen 60 mm., hind wing 52 mm., alar expanse 108. Occiput as in the male excepting a narrow, better-defined dark line running from the sides on the crest which bears a black tubercle. Frons dark brown excepting a yellow patch on the back. Post-clypeus yellow, ante-clypeus dark brown. Labrum yellow, bordered in front with dark brown, a pale brown line extending from the base half way down the middle. Cheeks yellow; mouth parts brown, excepting the ends of the mandibles which are black. Back of head as in the male. Thorax as in the male.

Abdomen darker toward the posterior end, not dilated behind but about the same width from the fourth segment to the end. Yellow dorsal spots on segments 1–8 much like those on the male. The suture between 8 and 9 bears seven narrow, brown longitudinal bands, one on the dorsum and three on each side. Dorsum of 9 black, but the sloping places on each side pale brown Dorsum of 10 and the upper surface of the appendages paler. Sides of 1–3 bordering the ventral suture yellowish-brown. A brown twin spot on the ventral base of 8. Black granules on abdomen as in the male. Appendages brown, as long as 10.

Described from about twenty males and two females taken from June 8th to July 15th, at Orono in open woods, and over a brook in Bradley by F. L. Harvey. None were *in coitu*, but the female taken in the woods was with a male which was

taken. The males were very abundant over a meadow brook in Bradley in July, when twenty-five were taken. We saw two females seized by males and immediately the pairs left the brook and went sailing over the field out of sight.

The average of many Maine male specimens gives alar expanse 93 mm., total lengh 70 mm., antecubitals 19–20, postcubitals 12–13. Ours are as large as Ohio specimens according to Kellicott. The females from Maine are much larger than the males, viz.; alar expanse 108 mm., total length 78 mm., antecubitals 22, postcubitals 14, but these are not as large as Say's specimens. Possibly the cold climate may make the specimens smaller. Maine specimens of *C. maculatus* are much smaller than in Hagen's description. The females of this species are also much larger than the males.

45. **Cordulegaster diastatops** Selys.

This species, reported as scarce in a previous article, has been found abundantly. It was taken in July flying with *C. obliqua* over a brook in Bradley.

Subfamily 5, ÆSCHNINÆ.

74. **Epiæschna heros** Fabr.

A single female taken July 4 at Chemo Mills, Bradley, over the water (Harvey). The frons above in one specimen has *not* a well marked black T-spot, the center above is dark, and on each side of the dark area near the anterior border is a circular green spot; the vertex is black with a heart-shaped green spot in the center; the abdomen has only green, *no blue*.

41. **Boyeria vinosa** Say.

This species was abundant in August about the dams, falls and swift water on the Wissattiquoik nearly to the base of Mt. Ktaadn, also on the upper of the three ponds near the South Basin. It was also plentiful on Russell Stream, August 25-29, 1899, following the banks, minutely inspecting the indentures of the shore and closely examining every old log and bush, as though in quest of something. It is a busy species, flying near the water and, although not wary, is rather hard to catch. The males were fully ten to one female.

18. **Æschna constricta** Say.

Taken September 4th at Six Ponds near the base of Mt. Ktaadn. The female was observed submerged up to the head, laying eggs upon a water plant. Abundant the last of August on Russell Stream and the West Branch at Northeast Carry, also on the summit of Mt. Kineo, Moosehead Lake.

21. **Æschna clepsydra** Say.

With the above at Six Ponds, abundant.

16. **Anax junius** Drury.

Not abundant about Orono. Several seen June 13, 1899. The spot on the front above is black. The rings said to surround this spot are interrupted for a considerable distance at the back. The inner ring is yellow, not green. The outer ring is blue only in front and fuscous at the sides. The blue does not extend beyond the 6th segment of the abdomen. Segments 7–10 bear pale green spots on the sides. The remainder of the surface black, gradually becoming brown on the 10th.

Subfamily 6, CORDULINÆ.

74. **Macromia illinoiensis** Walsh.

This beautiful species was taken in considerable numbers from June 15th to July 15th at Orono and Bradley. The Orono specimens were taken in open woods along roads, the Bradley specimens along the Penobscot River. They were flying up and down the rocky shore. We waded out to their line of flight and took ten in one hour. The specimens are quite variable as to the spots on the abdomen. Eight specimens examined had two spots on dorsum of 2. Usually no dorsal spots on 5 and 6, but one male and one female had dorsal spots on these segments. All the males examined had two spots on dorsum of 8, but only one female was so marked. Yellow spots on thorax at dorsal base of wings. Wings sometimes hyaline, often fumose throughout.

66. **Cordulia Shurtleffi** Scud.

Taken in 1898 in Bradley over a small meadow brook. We have taken only two specimens.

75. **Tetragoneuria spinigera** Selys.

This has been reported from Manchester by Miss Wadsworth. We found a single female, July 8, 1898, at Chemo Stream, Bradley.

76. **Neurocordulia yamaskanensis** Provancher.

On June 8, 1898, a single female was taken in a pasture near the border of woods, and the same evening my son, R. H. Harvey, took a single male a mile away in a similar situation. At the same locality, and nearly the same date, in 1899, we took four males and one female. We are not aware that any other specimens excepting those taken by Abbé Provancher at Mt. Yamaska, Province of Quebec, in 1875, are in collections. Our specimens are the first taken in the United States, and the species may be looked for in other States bordering on Canada.

64. **Somatochlora elongata,** var. **minor** Calvert.

Early in July, 1898–9, fully thirty males were taken over a small brook in Bradley, which rises in the woods, traverses a pasture and meadow and empties into the Penobscot opposite Orono. In July the brook is reduced to isolated pools, and in very dry seasons is dry in August. We have also taken a few on Vinal Brook, on the west side of the Penobscot, a mile above. They fly over the brook and alight on the grass occasionally, but are usually balanced over the pools, or close to the water between the grassy banks, and, wary as hawks, requiring a very swift swing of the net and a sure aim. We have searched this brook day after day for females and saw only one; it was ovipositing and left for haunts unknown before we could catch it.

77. **Somatochlora septentrionalis** Hagen.

A single ♂ was taken at Orono, June 18, 1898, over a small bog by my son, Bartle Harvey. This species, so far as we know, has never before been found in the United States. The locality was visited in 1899 but none were seen.

78. **Somatochlora Walshii** Scud.

Taken along the Stillwater River at Orono early in June a single male, and abundantly early in July, 1898–9, over a meadow brook in Bradley (Harvey). In two days we took over twenty-five specimens, all males and saw no females.

This species was associated with *S. elongata* var. *minor* and *Cordulegaster obliqua*.

27. **Somatochlora libera** Selys.

A single specimen taken at Orono early in June by Bartle Harvey.

Subfamily 7, LIBELLULINÆ.

31. **Libellula 4-maculata**, var. **prenubila** Newm.

A single specimen of this variety taken at Orono in 1898. The species is very common, the variety rare (Harvey).

79. **L. semifasciata** Burm.

A single specimen taken over a small pond, 1898. During June and July, numerous specimens were taken at Orono and Bradley (Bartle and F. L. Harvey).

80. **Celithemis ornata** Rambur.

A single specimen taken at Chemo Pond, Bradley, August 20, 1899, by Bartle Harvey. We saw several specimens the same day, but they were flying over the pond and would not come near the boat. Our specimen had the color at the base of the wing solid, and seemed to be the dark form spoken of by Dr. Calvert. This species was flying with *C. elisa* Hagen.

51. **Leucorhinia frigida** Hagen.

A single specimen taken at Chemo Stream, Bradley, July 11, 1899. This is the latest species of the genus to appear. It is on the wing after the others have gone. Scarce, only two specimens taken in ten years' collecting.

81. **Leucorhinia glacialis**. Hagen

Two specimens, male and female, taken at Orono, June 7, 1898. A single specimen taken June 2, 1899, at Chemo Stream, Bradley. A rare species in Maine.

38. **Sympetrum semicinctum** Say.

Chemo Stream, Bradley, September 13, 1899. Several specimens.

82. **Sympetrum obtrusum** Hagen.

A single specimen taken at Fryeburg, Me., August 10, 1899 (Harvey).

37. **Sympetrum vicinum** Hagen.

This species is the latest one of this genus on the wing in Maine. Specimens were taken at Ktaadn Iron Works, October 14, 1899, and we have seen them as late as November about Orono. Many pairs were seen mating and ovipositing at Chemo Stream, October 8, 1899.

36. **Sympetrum rubicundulum** Say.

Common on Russell Stream the last of August, 1899. Several specimens seen August 24th on the top of Mt. Kineo, Moosehead Lake. On the shore of Moosehead Lake, by a small pond near Cliff Beach, we saw several hundred pairs mating. We have never before seen so many specimens together of any species.

Odonata Collected at Fryeburg, Me.—Between August 9th and 12th, we were at Fryeburg, Me., and spent one forenoon along the old river ponds, to the west of the present channel of the Saco River, collecting Odonates. The locality is close to the New Hampshire line, and the species will be interesting as representing an extreme western Maine location. The species observed were as follows: *Lestes disjunctus, forcipatus, rectangularis, vigilax; Nehalennia irene; Enallagma Hageni; Ischnura verticalis; Libellula pulchella; Sympetrum rubicundulum, vicinum* and *obtrusum*.

Lestes vigilax seems to be a western Maine species, as it has not been taken in the Penobscot valley. The only other Maine locality we know for *Sympetrum obtrusum* is York Harbor (Moore).

THE END.

A New Pammegischia.

By WILLIAM H. ASHMEAD.

Dr. E. P. Felt, State Entomologist of New York, has recently sent to Dr. L. O. Howard, a parasite bred from a horntail saw-fly *Xiphidia provancheri* Cresson, which proves to be a new species in the rare genus *Pammegischia* Provancher.

It is here described at the request of Dr. Felt.

Pammegischia xiphydriæ, new species :—

♀. Length 7.5 mm.; ovipositor about two-thirds the length of the abdomen. Black, with the first segment of the abdomen red, the second joint of the front and middle trochanters and bases of their tibiæ testaceous, the remainder of legs black (all, however, are broken off about the middle of the tibiæ, so that I am not quite certain that the tips of the tibiæ and the tarsi are black). The head is quadrate, above smooth and highly polishd with only a few scattered punctures; in front, below the front ocellus to the insertion of the antennæ it is transversely rugulose; while beneath the antennæ, except the lower inner angles of the malar space, which are smooth and polished, it is closely irregularly punctate. The mandibles are black with a rufo-piceous tinge basally. Palpi fuscous. The thorax is rugosely punctate, the mesonotum with numerous transverse ridges and with complete parapsidal furrows. Wings hyaline or at most only faintly tinged, the stigma and veins being black or brown-black, the first recurrent nervure being received by the second cubital cell only a little beyond the middle, while the third cubital cell is more or less divided into two by a spurious stump of a vein which originates from the cubitus a little before the apex of the second recurrent nervure. All the coxæ are black and regulose, the hind pair being elongate and produced beneath into a triangular process that extends far beyond the insertion of the trochanters. The abdomen is highly polished, impunctate, except at its extreme base, and shaped as in *Aulacus* or *Pristaulacus*, only that it is not so distinctly petiolate, the first segment occupying fully half its whole surface.

Type.—Cat. No. 5782, U. S. N. M.

Hab.—Saranac Inn, New York.

Hort.—Hym. : *Xiphydria provancheri* Cresson, living in birch twigs (Dr. E. P. Felt).

For a generic synopsis of the Subfamily *Aulacinæ*, to which this genus belongs. See my classification of the Ichneumon Fies, or the Superfamily Ichneumonoidea*, p. 8.

The following North America species, described under the genus *Aulacus* Jarine, should be placed in the genus *Pristaulacus* Kieffer, viz., *Aulacus fasciatus* Say, *A. abbotii* Westw., *A. niger* Shuck., *A. stigmaterus* Cr., *A. consors* Cr., *A. editus* Cr., *A. montanus* Cr., *A. rufitarsis* Cr., *A. occidentalis* Cr., *A. firmis* Cr., *A. bilobus* Prov., *A.pallipes* Cr., *A. minor* Cr., *A. pacificus* Cr., and *A. meleus* Cr.

* Proc. U. S. Natl. Mus. xxiii, 1900.

On the Stridulation of Passalus Cornutus Fabr.

By GEORGE F. BABB, A.M., Amherst, Mass.

During the fall of 1900, a large number of *Passalus cornutus* Fabr. were taken from decaying apple, oak, chestnut and elm logs in the vicinity of Amherst. These beetles, when disturbed, all made a peculiar hissing noise which at once attracted attention.

Riley states, in describing this insect, that "a sufficiently careful examination will end in the knowledge that it is caused by the rubbing of the pygidium against the inside of the wing-covers" (Mo. Rep. iv, p. 139, 1872).

Le Conte remarks that "*Passalus cornutus* makes a loud stridulation by rubbing the acute edge of the ventral segments against the inner edge of the elytra" (Psyche ii, p. 126, 1878); and Ohaus goes to great length in a description of the abdominal pleurites and of the inner edges of the wing-covers as the factors in the production of the sound (Stett. Ent. Zeit. 61, p. 164, 1900).

Packard, in his article on "Sounds of Insects" (Text-book of Entomology), makes no mention whatever of *Passalus cornutus*.

Sharp states that "the adult insect has no sound-producing organs," and emphasizes the statement by contrasting the adults with the larvæ (Camb. Nat. Hist. vi, p. 192, 1899).

Prompted by this conflict of authorities the writer carried on at the Entomological Laboratory of the Massachusetts Agricultural College a series of carefully conducted experiments under the direction of Dr. H. T. Fernald. The results obtained do not agree with those quoted above.

It is not surprising that Le Conte was mistaken, for on the pleurites of the segments of the abdomen are plates covered with bristles directed upward and on the corresponding portions of the elytra are bristles directed downward as described by Ohaus. The interference of the bristles might naturally be thought to produce the hissing sound so peculiar to *Passalus cornutus*. This impression would be strengthend by the fact that every time that the intermittent sound is heard the insect moves its abdomen upward into the cavity formed by the elytra.

After removing from live beetles all of those portions of the elytra that could be reached by the pleural plates, it was found that the insects could stridulate as loudly as before.

Following out Riley's idea, the portion of the elytra that could be rubbed by the pygidium was removed from several live beetles and the same result was obtained as in the previous experiment.

As another experiment, melted paraffin was run in between the edges of the abdomen and elytra. This on solidifying effectually prevented any motion of the abdominal pleurities or of the pygidium, but the beetles could still stridulate.

Finally beetles from which both elytra had been entirely taken away continued to produce the sound though but faintly.

It was observed that with every raising of the abdomen there was a simultaneous forward motion of the dorsal portion of the fifth segment. Here, about half way from the center to each lateral edge (see Fig. 1, A) was found an ovate area about 4.5 mm. long by 2.5 mm. at its greatest breadth and with a convex surface. This area, when magnified about 700 diameters (Fig. 2), appeared as a regularly cross-lined surface not unlike a rasp, but when examined in cross-section (Fig. 3), was seen to be closely studded with erect stout spines, their tips curving forward about .01 mm. in length at the center of the area and shorter toward the boundaries.

The only portion of the insect with which these areas could come in contact to produce stridulation were not the elytra, but the wings; and so incisions were made near the base of the elytra of live beetles and the wings removed through these leaving the wing-covers still in place. When this had been done the beetles were unable to produce any sound though they continued to move their abdomens up and down in the evident effort to stridulate.

As a final experiment fresh beetles were taken and these areas in turn were coated with paraffin and the result was silence.

The wings were found to be more strongly chitinized at the folds, and the portions of these that would come in contact with the described areas of the abdomen were covered with ridges running transversely to the axis of the body and with short spines directed backward (Fig. 4).

Fig. 1.

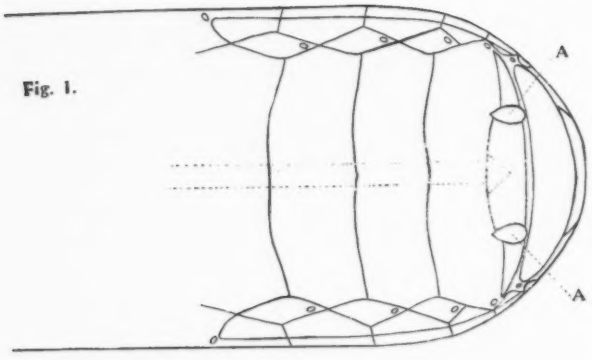


Fig. 2.

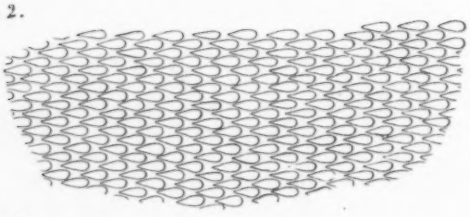


Fig. 3.

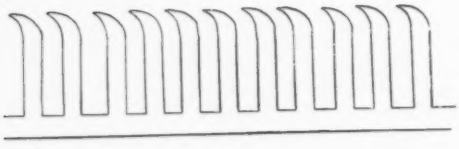
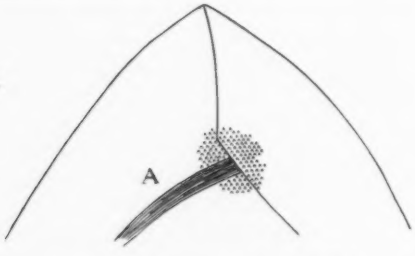


Fig. 4.



STRIDULATION OF PASSALUS CORNUTUS (BABB.).

Thus the wings are pressed upward against the elytra by the raising of the abdomen, the spinous areas described are rubbed across the specialized portions of the wing-folds and this process results in the production of the sound.

All the specimens studied, over a hundred in number, produced apparently the same sound. Among these occurred both males and females as determined by dissection. The observed stridulation occurred only when the beetle was disturbed. These facts would lead to the conclusion that it was evidence of the insects' displeasure at being disturbed and not a sexual call.

EXPLANATION OF PLATE XII.

Fig. 1.—Dorsal surface of the abdomen (x 11): A, stridulating areas.
Fig. 2.—Portion of surface of Fig. 1, A (x 350).
Fig. 3.—Vertical section of Fig. 2.
Fig. 4.—Under surface of the hind portion of one wing showing the part rubbed by the stridulating area (x 11): A, representing the strongly chitinized and ridged vein.

Letters from Thomas Say to John F. Melsheimer, 1816–1825.—VIII.

Philad^{a} March 13th 1819.

My dear Sir!

I have been so continuously occupied in preparing for our Western Expedition that I have hardly time even to write to my friend at parting. If I recollect rightly I informed you of our destination to examine all the immense Western waters—the Mississippi, its tributaries, some of the Lakes & perhaps some of the rivers still further south—Besides my own department, viz. Zoology, we shall be accompanied by a Botanist (D^{r} Baldwin), a Geologist & Mineralogist (M^{r} Jessup), & M^{r} T. Peale will accompany me to prepare the skins of such animals as may be discovered. Our Commander Major Long has furnished himself with the necessary instruments for Astronomical and other observations; so that I think we shall go well prepared—Our Steamboat at Pittsburg is nearly ready & it is ordered that we depart from Philad^{a} in all next week—It is further determined that we shall return to Pittsb^{g} to winter next season—All this is *inter nos*.

I sent with the Novr Nº of our Journal the plate of Cicindela which was publishd with my Monograph of that Genus in the Philosophical Transactions of this City—The figures were drawn & the plate engraved & published during my absence in Florida, so that I had no opportunity of correcting the errors, which you would, no doubt, have detected in it had you seen the publication—fig. 10 instead of representing *C. formosa* is a meer variety of *C. pusilla* (fig. 12)—fig. 11 instead of representing *C. 10-notata* is a meer variety of *C. punctulata* of Oliv. (fig. 9.) or *C. obscura* of your Catalogue—

fig. 1—C. vulgaris—
C. trifasciata (Melsh. Catal.) } This is certainly different from the trifaciata of Europe—

" 2 " hirticollis—
" 3 " unipunctata (Fabr)
" 4 " 6-guttata (Fabr)
" 5 " dorsalis—
" 6 " marginata (Fab)
" 7 " obscura—(Fab)
" 8 " purpurea, marginalis?, tristis? } (Fab)
var. a.—C. ramosa (Melsh. Catal)
" 9 " punctulata (Oliv)
" obscura (Melsh. Catal)
" 10 " pusilla, var.—
" 11 " punctulata, var.—
" 12 " pusilla—

I lately sent the Decr Nº of the Journal to you, which I believe will make your series complete, as none has been since published, & whether or not, it will be continued during my absence, I cannot at present say, but if I can make the necessary arrangements for its continuance, I will certainly direct copies to be transmitted to you. In order to facilitate its publication I shall leave papers for it, on our indigenous insects of the Orders Myriapoda, Thysanoura & Arachnides—

I have also left for the Trans. Philos. Soc. an extensive paper on the Linnæan genera Carabus & Dytiscus, arranged accord-

ing to the modern improvements, in which I have taken the liberty of mentioning you & of referring to your Catalogue for all the insects of those genera which you have kindly communicated to me. I shall direct a copy of the article to be transmitted to you as soon as published which will probably be next Autumn—

Your excellent observations on the genus Hister I have treasured up, & shall certainly quote you for them at a future day, as well as for any other communications, which, coming from you, I shall highly appreciate.

In the interim I remain
very respectfully,
Your friend & Obd^{t} Serv^{t}
Thomas Say

In the June number of the NEWS Mr. Sidney Carpenter suggests that *Chionobas semidea* should be protected by law. I take pleasure in stating that this interesting insect is already protected by the highest of all laws (the survival of the fittest) as well as by the nature of its environment.

Mr. Carpenter's article reminds me of an incident in my own experience of collecting on Mt. Washington. One beautiful July morning I had climbed some way down from the summit in search of insects, when I came across two ladies—mother and daughter—both with butterfly nets. We were soon sufficiently well acquainted to enter into a conversation, and the ladies very earnestly urged me not to collect too many of Chionobas, as it would be most unfortunate to see this insect exterminated.

With all the courtesy at my disposal, I assured the ladies that I would be no party to the extermination of this species. No one, however, who had ever visited the region would have the least anxiety on the subject. There is as little danger as there would be in supposing that *Colias philodice* should be exterminated on Staten Island, since, even though the island inhabitants were all killed off, there would be numerous emigrants from the mainland. The rugged, rocky top on Mt. Washington covers an area probably never thoroughly explored by the most ardent collectors, and even were it possible to destroy all of the members of the species on this mountain, the adjacent peaks of Jefferson and Adams rarely resound to the footfalls of man, whilst *Chionobas* lies in peace and abundance on all three summits which arise above the tree line.

In addition to this, the larger number of captures are males, and when the females are taken they very nearly always have already deposited their eggs, consequently I believe there is no immediate necessity for the legislative enactment in favor of *Chionobas*.—R. OTTOLENGUI, New York, June 2, 1901.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., NOVEMBER, 1901.

"De esta magnifica publicacion" (*Revista Chilena*). The NEWS is as good as we can make it under present conditions. The subscription price is very low; the NEWS costs more than we ask for it. We need an invested fund for the journal of at least five thousand dollars. If any of our readers are thinking about willing a portion of their wealth for the benefit of humanity, they should remember the NEWS. Large sums of money are given for other purposes far less worthy. In the large cities, hospitals are helping to pauperize the community. The lessening of sickness and disease lies in prevention. The NEWS is doing good work in the dissemination of knowledge in regard to the carriers of disease (insects). In times of war the prevalent sickness, typhoid fever, is almost entirely due to house-flies. Bullets (lead) kill comparatively few. Malaria and yellow fever also add materially to the mortality list. The loss of service and the care of sick soldiers mean the expenditure of fabulous sums of money. The British, in the Boer war, have had over 125,000 men invalided, and we lost 8,000 by disease in our war with Spain. These diseases are preventable by a knowledge of entomology, and the NEWS supplies a medium for disseminating this information. We believe the wealthy can aid humanity by aiding the NEWS.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

PROF. SMITH informs us that the collection of the late Dr. George D. Hulst is now in his hands at New Brunswick, New Jersey, forming part of the Rutgers College Collection.

In December, 1891, Dr. Hulst gave his collection to Rutgers, but reserved to himself the right to retain any portion that he wished to study, for such period as he might desire. Pursuant to this gift the Rhopalocera, Sphingidæ, Bombycid and Noctuid families were sent to New Brunswick during the early part of 1892. The Tortricids and Tineids followed a little later, but the material was small. The Geometrids and Pyralids were retained under the reservation made in the gift, until the death of Dr. Hulst, who added largely to them during his life time. The executors did not at once deliver the collection to the College, and in the nearly six months during which it had no attention it has become somewhat damaged Nor is the material as a whole in first class condition though much can be greatly improved. It is essentially a study collection from which wings have been taken or scraped to make out details of Venation, and other structural parts removed for mounting on slides.

In the Pyralidæ there are 496 species and varieties in 1725 specimens, and of 237 species and varieties there are types.

In the Geometridæ there are 721 species and varieties in 2115 specimens, and of these 300 or more are types. The count has been roughly made as yet, and the number of species and types will probably prove greater when all are aranged.

The collection of Rhopalocera contained 443 species and varieties in 1360 specimens; that of Sphingids 60 species and varieties in 120 specimens; that of *Catocala* 117 species and varieties in 335 specimens, and in this series are 12 types. The remainder of the collection is merely estimated as yet; but a conservative estimate places the entire collection at over 2237 species and varieties, in over 6600 specimens, with 550 types or over.

New cases are to be provided and the arrangement of the Geometrid collection will be begun as soon as possible.

IT IS of interest to note that Linné gave no less than three names to the honey bee. In 1746 (Fauna Suecia, No. 1003), he designated it as *Apis gregaria*. In his Tenth Edition of the *Systema Naturæ*, which marks the beginning of bimonial nomenclature, it stands as *Apis mellifera;* and apparently not satisfied with this appropriate name, he again changes it to *Apis mellifica* in the Twelfth Edition of *Systema Naturæ*, 1767

Obviously, the proper name of the insect is *Apis mellifera*, and not *Apis mellifica* as it has been termed by one writer after another since Linné's time. *Mellifica* may be the more appropriate as far as meaning goes, but *mellifera* has priority by several years.—WILLIAM J. FOX.

Entomological Literature.

COMPILED BY P. P. CALVERT.

Under the above head it is intended to mention papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South). Articles irrelevant to American entomology will not be noted. Contributions to the anatomy, physiology and embryology of insects, however, relating to American or exotic species, will be recorded. The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published; * denotes that the paper in question contains descriptions of new North American forms. Titles of all articles in foreign languages are translated into English; usually such articles are written in the same language as the title of the journal containing them, but when such articles are in other languages than English, French, German or Italian, this fact is indicated in brackets.

4. The Canadian Entomologist, London, Ont., Oct., '01.—**5.** Psyche, Cambridge, Mass., Oct., '01.—**6.** Journal of the New York Entomological Society, Sept., '01.—**7.** Bulletins (new series), U. S. Department of Agriculture, Division of Entomology, Washington, '01.—**11.** The Annals and Magazine of Natural History, London, Sept., '01.—**12.** Comptes Rendus. L'Academie des Sciences, Paris, '01.—**14.** Proceedings of the Zoological Society of London, '01, i, 2, Aug. 1.—**15.** Biologia Centrali-Americana, London, Feb., '01, and April, rec'd. June 3, May and June, rec'd. Aug. 17, '01.—**22.** Zoologischer Anzeiger, Leipsic, '01.—**24.** Berliner Entomologische Zeitschrift, xlvi, 1, June, '01.—**36.** Transactions, Entomological Society of London, '01, pt. iii, Sept. 30.—**40.** Societas Entomologica, Zurich-Hottingen, '01.—**44.** Verhandlungen, zoologisch-botanischen Gesellschaft in Wien, li, 6, August 18, '01.—**50.** Proceedings, U. S. National Museum, Washington, '01.—**54.** Journal, Royal Horticultural Society, xxvi, 1-2, London, Aug., '01.—**58.** Revista Chilena de Historia Natural, Valparaiso, July, '01.—**80.** Annali, Museo Civico di Storia Naturale di Genova (2a), xx, '01. Rec'd. Aug. 26.—**84.** Insekten Börse, Leipsic, '01.—**87.** Revue Scientifique, Paris, '01.—**108.** The Agricultural Journal, Cape Town, '01.—**130.** Proceedings, Manchester [New Hampshire] Institute of Arts and Sciences, ii, '01.

THE GENERAL SUBJECT.—Berlese, A. Phenomena which occur during the nymphosis of metabolic insects, **22,** Sept. 2.—**Chittenden, F. H.** Insects and the weather during the season of 1900, **7,** 30.—**Cockerell, T. D. A.** Notes on the food of birds, Bulletin No. 37, New Mexico College of Agriculture and Mechanic Arts, Mesilla Park, N. M., March, '01.—**Delfin, F. T.** The Rio Palena, notes on its natural history [in Spanish], **58.**—[**Editor.**] The entomologist's guide in the field [in Spanish], **58.—Thaxter, R.** Preliminary diagnoses of new species of Laboulbeniaceæ, iv, Proceedings, American Academy of Arts and Sciences, xxxviii, 2, Boston, June, '01.

ECONOMIC ENTOMOLOGY.—Anon. The Colorado Potato beetle in England, **4.—Anon.** Heartwater in sheep and goats, **108,**

Aug. 29.—**Barbey, A.** Die Bostrichiden Central Europas. Eine morphologische und biologische Studie der Familie der Borkenkäfer mit Rücksicht auf den Forstschutz. Für Forstwirte, Baumzüchter u. Entomologen. Mit 18 nach Photographien u. Zeichnungen des Verfassers ausgeführten Tafeln. Genf u. Geissen. 1901. 4to. 119 pp.—**Beach, S. A.** Recent developments in the treatment of diseases and insects injurious to orchard crops, fig., **54.**—**Billet, A.** On the simultaneous appearance of mosquitos of the genus *Anopheles* and of the first cases of malaria in the Constantine [Algeria] region, **12,** Sept. 9.—**Blanchard, et al.** Mosquitos at Paris, **87,** Sept. 7.—**Chittenden, F. H.** Some insects injurious to the Violet, Rose and other ornamental plants: a collection of articles dealing with insects of this class, figs., **7,** 27; The fall army worm [*Laphygma frugiperda*] and the variegated cut worm [*Peridroma saucia*], **7,** 29; The green clover worm, figs., **7,** 30.—**Forbes, E. B.** The Hessian fly [in Minnesota], Press Bulletin No. 13, Agric. Exper. Station, St. Anthony Park, Minn., Aug. 12, '01.—**Frers, C.** Report of the general enquiry into the invasions of locusts in Argentina during 1898-99 and 1899-00, **108,** Aug. 1, 15.—**Gastine, G., Vermorel, V.** On the ravages of *Pyralis* in the Beaujolais and on the destruction of nocturnal moths by luminous torches fed with acetylene gas, **12,** Sept. 23.—**Grassi, B.** Concerning paludism without malaria, Rendiconti, Reale Accademia dei Lincei, Rome, Sept. 15, '01.—**Hinds, W. E.** Fumigation with carbon bisulphide, **7,** 30.—**v. Holub, C.** Insects as a living substratum for the cultivation of infectious diseases of man and animals, Centralblatt für Bakteriologie, xxx, 7, Jena, Sept. 10, '01.—**Hopkins, A. D.** Insect enemies of the spruce in the Northeast. A popular account of results of special investigations, with recommendations for preventing losses, figs., 16 pls., **7,** 28.—**Howard, L. O.** The carriage of disease by flies, figs., **7,** 30.—**Johnson, W. G.** Fumigation of nursery stock, figs.; Emory fumigator for growing trees, figs., **54.**—**King, G. B.,** and **Reh, L.** On some European and other *Lecanium* collected on introduced plants, Jahrbuch, Hamburgischen Wissenchaftlichen Anstalten, xviii, 1900. 3. Beiheft, Mitteilungen aus dem Botanischen Museum, '01.—**Lounsbury, C. P.** Tree fumigation in California, figs., **108,** Feb. 14; Report of the Government Entomologist for the year 1900. Cape of Good Hope Department of Agriculture, Cape Town, '01. 5 pls.—**MacCartney, B. F.** Reports of the Economic Zoologist [for 1899 and 1900]. Some insects injurious to fruit, shade trees and clover, figs. Fifth Annual Report, Pennsylvania Department of Agriculture, 1899, pt. 1. [Harrisburg], 1900. Rec'd. Oct. 11, '01. Some insects injurious to stored grain and cereal products and to shade trees. Sixth Report of same, 1900, pt. 1.—**Mally, F. W.** Mexican cotton-boll weevil, figs., Farmer's Bulletin No. 130, U. S. Dept. of Agriculture, Washington, '01.—**Marlatt, C. L.** Some insecticide experiments, 2 pls., **7,** 30.—**Massee.** South African locust fungus, 1 pl., Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew, Nos.

172-4, April-June, '01.—**Maxwell-Lefroy, H.** Insect attack on cacao trees in Grenada, Bulletin 28, Miscellaneous Information, Botanical Dept. of Trinidad, '01. (See also Bull. 29. l. c., for an anonymous note on a cacao moth of the family Tineidæ).—**Morgan, H. A.** The differential grasshopper in the Mississippi delta, other common species, figs., **7,** 30.—**Munro, A.** The locust plague [in S. Africa] and its suppression, **108,** Aug. 15.—**Quaintance, A. L.** The pickle worm (*Margaronia nitidalis* Cramer), figs. Bulletin 54, State College of Agriculture and Mechanic Arts, Georgia Exper. Station, Experiment, Ga., July, '01.—**Simpson, C. B.** Report upon an investigation of the codling moth in Idaho in 1900, **7,** 30.—**Slingerland, M. V.** A glance into the past and future, and some of the insect episodes of 1900, Proceedings, Western New York Horticultural Society, Jan. 23 and 24, '01, Rochester, N. Y.—**Treupel, G.** On malaria (swamp fever) and its contravention, Berichte, naturforschenden Gesellschaft zu Freiburg i B. xi, 3, '01.—**Vicente.** Transmission of malaria by the scale insect *Aspidiotus nerii,* **87,** August 17.—**Webster, F. M.** The southern corn-leaf beetle [*Myochrous denticollis* Say]: a new insect pest of growing corn, 3 pls., **6.**—**Wilcox, E. V.** Abstracts of recent papers, Experiment Station Record, xiii, 2, U. S. Dept. of Agric., Washington, '01.—Numerous short articles and notes in, **7,** 30, by various authors.

ARACHNIDA.—Banks, N. Some spiders and other Arachnida from Porto Rico,* 1 pl., **50,** no. 1253, rec'd Oct. 5.—**Börner, C.** On the external morphology of *Koenenia mirabilis* Grassi, figs., **22,** Sept. 16.—**Cambridge, F. O. P.** Arachnida Araneidea, vol. ii, pp. 209-248*, **15,** Feb.., Apr., May, June.

PROTOTRACHEATA.—Evans, R. On two new species of Onychophora from the Siamese Malay States, 6 pls.; *Eoperipatus Butleri* nov. sp., 1 pl., Quarterly Journal of Microscopical Science, London, Aug., '01; On the Malayan species of Onychophora: ii. The development of *Eoperipatus weldoni,* 5 pls., *l. c.*. Sept., '01.—**Sänger, H.** *Peripatus capensis* Sr. and *P. Leuckartii* n. sp. [from the Travaux du deuxième congres des naturalistes russes à Moscou, 20-30 Aug. 1869]; Bulletin, Société Philomathique de Paris (n. s.) iii, 1, '01.

MYRIOPODA.—Chamberlin, R. V. List of the myriapod family Lithobiidae of Salt Lake County, Utah, with descriptions of five new species*, **50,** no. 1232. Rec'd Sept. 28.—**Heymons, R.** The developmental history of *Scolopendra,* ii, 8 pls., Zoologica xiii, 4-5, Stuttgart, '01.—**Rossi, G.** A nest of *Julus,* **22,** Sept. 2.—**Verhoeff, K. W.** On the phylogeny of the Diplopods, **22,** Sept. 2.

ORTHOPTERA.—de Bormans, A. Some Dermaptera of the Civic Museum of Genoa, **80.**—**Fogg, S. C.** A Rock Rimmon catch containing additional species of Orthoptera noted in the vicinity of Manchester [New Hampshire], **130.**—**Morgan, H. A.** See Economic Entomology.—**Portchinsky, J.** Observations on some new and

little-known Orthoptera with biological notes [transl. from Russian], Entomologists' Record, London, Sept. 15, '01.—**Rehn, J. A. G.** Some necessary changes and corrections in names of Orthoptera, **4**; Notes and remarks on Mexican Orthoptera with descriptions of new species* [two papers], Transactions, American Entomological Society, xxvii, Philadelphia, Sept., '00, May, '01.—**Scudder, S. H.** *Miogryllus* and its species in the United States*, **5**.

NEUROPTERA.—Burnham, E. J. Additional notes on the [Odonata] Anisoptera in the vicinity of Manchester, N. H., **130**.

HEMIPTERA.—Ball, E. D. A review of the Tettigonidæ of North America north of Mexico*, Proceedings, Iowa Academy of Sciences, viii, Des Moines, '01, and Ohio State University Bulletin (5) 21, Columbus, O., July, '01.—**Breddin, G.** New neotropical bugs, **40**, July 1, 15, Sept. 1, 15, Oct. 1.—**Distant, W. L.** Revision of the Rhynchota belonging to the family Coreidæ in the Hope Collection at Oxford, 2 pls., **14**. **Howard, L. O.** On the habits of *Entilia sinuata*, figs,. **7**, 30.—**Hueber, T.** Synopsis of the German Capsidæ, vi, Jahreshefte, Verein für vaterländische Naturkunde in Württemberg, lvii. Stuttgart, '01.—**King, G. B.** *Kermes quercus* L., **5**.—**Lidgett, J.** A catalogue of Australian Coccidæ, The Wombat [place of publication?], iv, no. 3, pp. 37–64, May, '99.—**Montandon, A. L.** Notes on some Hemiptera, Heteroptera and descriptions of new species from the collections of the Civic Museum of Genoa, **80**.

COLEOPTERA.—Barbey, A. See Economic Entomology.—**Bernhauer, M.** The Staphylinidæ of the palæarctic fauna, **44**.—**Blackburn, T.** Revision of the genus *Paropsis*, pt. vi, Proceedings, Linnean Society of New South Wales, 1901, i, Sydney, Aug. 13, '01.—**Donisthorpe, H. St. J. K.** Cases of protective resemblance, mimicry, etc., in the British Coleoptera, **36**.—**Gestro, R.** Systematic catalogue of the Paussidæ, **80**.—**Gorham, H. S.** Species of the subfamily Languriides contained in the Civic Museum of Genoa*, **80**.—**Hopkins, A. D.** See Economic Entomology.—**Jacoby, M.** New species of phytophagous Coleoptera from Paraguay; Descriptions of two new species of *Hermesia* (Chrysomelidæ, fam. Eumolpidæ), **80**.—**Kadic, O.** Studies on the labium of the Coleoptera, 1 pl., Jenaische Zeitschrift für Naturwissenschaft, xxxvi, 1–2, Aug. 15, '01.—**Menegaux, A.** On the biology of the Elm *Galeruca* (*xanthomelæna*), **12**, Sept. 9.—**Pic, M.** The diversity of classification of the Longicorns, Feuille des jeunes naturalistes Paris, Oct. 1, '01.—**Regimbart, M.** New Dytiscidæ and Gyrinidæ of the Civic Museum of Genoa, **80**; On some new Dytiscidæ from South America, **80**; **Schauf.** H. J. Kolbe's new classification of beetles, **84**, Oct. 3.—**Spaeth, F.** Two new Cassididæ from Paraguay collected by Sign. G. Boggiani, **80**.—**Wasmann, E.** Two new *Liometopum* guests from Colorado*, Wiener Entomologische Zeitung, xx, 7. Sept. 30, '01.

DIPTERA.—Banks, N. The eastern species of *Psychoda*,* **4.—Chagnon, G.** Preliminary studies on the Syrphidæ of the Province of Quebec, Naturaliste Canadien, *Quebec*, Sept., '01.—**Coquillett, D. W.** Types of Anthomyid genera, **6.—Doane, R. W.** Descriptions of new Tipulidæ,* **6.—Herrick, G. W.** Notes on the life history of *Anopheles punctipennis* and on the egg-laying of *Culex pipiens*, Science, New York, Aug. 30, '01.—**Noack, W.** Contributions to the developmental history of the Muscidæ, figs., 5 pls., Zeitschrift für wissenschaftliche Zoologie, lxx, 1, Leipsic, Sept. 10, '01.—**Robertson, C.** Some new Diptera,* **4.—Schmalz, J. B.** On the life-history of the Brazilian botfly, **84,** July 11.—**Speiser, P.** Studies on Hippoboscidæ, **80.—Williston, S. W.** Diptera, i, supplement, pp. 259-296,* **15,** April, May, June.

LEPIDOPTERA.—Anon. Caterpillars attended by ants, **4.—Butler, A. G.** A revision of the butterflies of the genus *Precis* and notes on seasonal phases of the species, **11.—Dyar, H. G.** Life histories of North American Geometridæ, xxvi, **5.—Fischer, E.** Further researches on the percentage of *Vanessa* aberrations, **40,** July 1, 15.—**Fletcher, J.** List of Lepidoptera taken in Baffin Land by Dr. Robert Bell in 1897, Annual Report, Geological Survey of Canada (n. s.), xi, report M, Ottawa, '01.—**Frings, C.** Are butterflies really captured in significant numbers by birds? **40,** Aug. 1.—**Godman, F. D.** Lepidoptera Rhopalocera, ii, pp. 597-692,* **15,** Feb., April, May, June (completing Hesperidæ and beginning Supplement to vols. i and ii).—**Hampson, G. F.** New species of Syntomidæ and Arctiadæ,* **11.—Moffat, J. A.** A surprise [*Telea polyphemus* double-brooded?], **4.—Nöldner, E.** Two new *Heliconius*, **24.—Ribbe, C.** Brief remarks on the capture of butterflies by birds, **84,** Sept. 19.—**Riffarth, H.** The genus *Heliconius* Latr. newly treated and description of new forms, **24.—Schaus, W.** A revision of the American Notodontidæ,* 2 pls., **36.—Sclater, P. L.** Lepidoptera of St. Lucia, West Indies, **14.—Smith, G.** Variation in the genus *Erebia*, i, Entomologist, London, Oct., '01.—**Smith, J. B.** Concerning protests and other things, **4.—Soule, C. B.** Mating of *Attacus gloveri*, **5.—Weeks, A. G., Jr.** New diurnal Lepidoptera from Bolivia, **4.**

HYMENOPTERA.—Cockerell, T. D. A. New bees of the subfamily Anthophorinæ from Southern California,* **4;** Bees from Southern California visiting flowers of *Eriogonum* and *Rhus*,* **4;** On some bees of the genus *Andrena* from New Jersey, **6.—Karavaev, V.** The internal metamorphosis and the anatomical peculiarities of the heart in the larvæ of ants [two brief notes in Russian] Zapiski Kievskavo Obschestva Estestvoispytatelei, xvi, 2, Kiev, 1900.—**King, G. B** A check-list of the Massachusetts Formicidæ, with some notes on the species, **5.—Kohl, F. F.** On a case of "frontal" gynandro-morphism in *Ammophila abbreviata* F., figs., **44.**

DEPARTMENT OF ECONOMIC ENTOMOLOGY

Edited by Prof. JOHN B. SMITH, Sc. D., New Brunswick, N. J.

Papers for this department are solicited. They should be sent to the editor, Prof. John B. Smith, Sc.D, New Brunswick, N. J.

DR. HENRY SKINNER,

Secretary American Entomological Society,

Dear Sir:

The State of Virginia has passed a law requiring all nursery stock coming into their State to be examined by a professional entomologist. Our State has a similar law, and has appointed Mr. —— to do the work. He has visited our nursery and has given us a certificate, but the Virginia State Entomologist declines to accept it, as Mr. —— is not known to him to belong to an entomological society and is not vouched for as being a skilled entomologist. The laws of Virginia will not allow us to ship any trees into their State without we have a certificate from their entomologist and pathologist tacked on each box, and Prof. W. B. Alwood will not issue that certificate without we furnish him one signed by a professional entomologist who has examined our nursery. Prof. Alwood states that any professional man known to the American Association of Economic Entomologists will be satisfactory to him.

Yours truly,

——— ———,

Pennsylvania.

The form of certificate of Pennsylvania reads as follows: "This is to certify that the stock in the nursery of ——— was duly examined in compliance with the provisions of the Act of the Legislature of Pennsylvania approved the 10th day of June, A. D. 1901, and was found to be apparently free from San José scale and other dangerously injurious insects, pest or pests. This certificate expires July 31st, 1902."

It will be observed that the date of examination is not given, although the certificate is dated in this instance August 21, 1901. The name of the examiner is not given, although the presumption is that the examination was made by the person or persons appointed by the State.

I wrote to Prof. Alwood on this subject, and take the liberty of quoting part of his reply: "* * * We not only have to bear the brunt of all this trying work in our own State, but we are held responsible by law for admitting nursery plants to the State. * * * I have worked for many years on the economic side of entomology, and presume it is fair to say that I know something of this phase of the question, and I have certainly had experience in administering the State laws. Notwithstand-

ing this long experience and knowledge that I have gained, various State authorities try to force upon me certificates of nursery inspection signed by political appointees or by men that are never heard of in the sense of technical workers. When I refuse to accept these, I am abused and reviled even to the point of very ungentlemanly expressions by some persons, but I have made up my mind that from this on no political officer or other untrained person shall be able to force a certificate on me. Unscientific as our economic work may often be, it is certainly worthy of some professional standing, and I shall see to it that it is so recognized in this State, and that other States dealing with us shall give us the word of a man equally well trained as we profess to be. In doing this I believe I am taking a proper stand, which should be the position of all trained workers."

I thoroughly coincide with Prof. Alwood, and all entomologists will undoubtedly agree that a proper professional standard should be maintained in economic work, or our efforts will only meet with ridicule. If such offices are pandered out as political rewards, we, as entomologists, must set our faces against such practices. —HERNY SKINNER.

DEAR DR. SKINNER:

Kindly permit me to say that I have never refused the certificate of any man because he did not belong to the American Association of Economic Entomologists. I have always insisted that persons *issuing* such certificates should *be known* to the members of this association as competent persons, *or that* the actual *work of inspection* should be done by a known worker trained in economic entomology. My position has been very much misrepresented by disgruntled persons. The whole gist of our requirements are contained in the following paragraph:

It will be the policy of this office to accept only certificates which show that the examination has been made by a person or persons of proper credentials as to their competency; *i.e.*, known entomologists or persons vouched for by known entomologists.—Very sincerely, W. B. ALWOOD.

The above correspondence is useful and important, giving rise to some very interesting questions. The State Entomologist of Virginia declares that the laws of New York and Pennsylvania must accord, not in essentials, but in detail, with the law of Virginia as interpreted by him, and he prescribes the qualifications that an inspector in those States must have. Indeed, he goes further and fixes the evidence that is required as an entomologist from some one known to him. The legality of these regulations is very decidedly questionable; but aside from this, there is another result. I have had the advantage of a personal meeting with the Pennsylvania Inspector, and while he is in no sense of the word an entomologist, I am convinced that he is perfectly able to find and recognize San José scale if it exists. As to his honesty in the performance of his duties, I must take it on trust, as I do that of all other inspectors. If I understood him correctly, Prof. Forbes holds that he cannot, in Illinois, refuse

or decline to recognize any certificate properly issued in the State where the examination is made. I am in much the same fix in New Jersey, and do not even feel justified in refusing certificates dated in June, before the first brood of scale is well under way, and when its first discovery in a block of peaches is almost a physical impossibility.

Another curiosity results from this: Prof. Alwood accepts certificates signed by Prof. Forbes and by myself. In Illinois and in New Jersey nurserymen are allowed to use the certificate given them upon stock which they themselves receive under certificate. In New Jersey the nurseryman makes a declaration to that effect on his tags. Now, a Pennsylvania grower may supply stock to an Illinois or New Jersey nurseryman, and the latter may ship it safely into Virginia! The whole thing is a mess as tangled as the marriage and divorce laws, and in ten years hence there will be no difference, so far as this scale is concerned, between States with and States without laws; *provided*, that the insect has already secured a foothold at this time.—JOHN B. SMITH.

Doings of Societies.

A meeting of the Entomological Section of the Academy of Natural Sciences of Philadelphia was held September 26th, Mr. Chas. W. Johnson presiding. Fifteen members were present and five visitors. Mr. Snyder exhibited specimens from Nantucket representing three hours' work. Mr. Seiss spoke of some odds and ends from Florida collected by Mr. Laurent. Among them were some scorpions, the females of which made nests of sand. The species was *Garyphus floridensis*. Mr. Rhen spoke of a trip he had made, with two other gentlemen, across the New Jersey pine barrens during June. He mentioned the capture of *Neonympha areolatus*. Dr. Skinner gave an account of his trip to New Mexico. Mr. C. W. Johnson mentioned that Dr. Skinner had collected two specimens of *Cuterebra* at Beulah, New Mexico, one of which was *C. lepivora* and the other not yet determined. Mr. Viereck exhibited a living specimen of *Tenodera sinensis* ♀, and stated that the males predominate, and are preyed upon by sparrows, which do not attack the pugnacious female mantids. They eat caterpillars and grasshoppers. Mr. Rehn said they had no difficulty in killing and eating *Melanoplus differentialis*. Mr. Horning stated that he had found the larva of *Fenescia tarquinius*

near Mount Moriah Cemetery. They were feeding on the beech tree *Aphis*. The caterpillar is soft and wooly and soapy to the touch. The *Aphis* drops a fluid which makes collecting the *tarquinius* very unpleasant. It took the larva four days to turn into a chrysalis. The changes in color and shape were mentioned.

Mr. Welles said he had also seen this larva. He also mentioned that the catalpa trees which had been defoliated by *Ceatomia catalpæ* were dead. Mr. Johnson exhibited specimens of *Trichopoda formosa* Wied, ♀, and *Trichopoda lanipes* Fab. ♂, which had been taken in coitu. They had been captured by Mr. Laurent at Miami, Florida. Although described as distinct, there is no doubt about their being the same species. Mr. Rehn mentioned having taken *Schistocerca rubigirosa* and *alutacea* in coitu, and thinks they are color varieties of one species.

DR. HENRY SKINNER, *Recorder.*

The regular stated meeting of the Feldman Collecting Social was held October 16th, at the residence of the Secretary, Wm. R. Reinick, 2245 N. Lambert Street, the members being his guests. Fourteen members present. President Charles W. Johnson in the chair.

The minutes of the last meeting were read and approved. Mr. Seiss mentioned the fact that he had had a number of specimens under the name of *Schistocerca rubiginosa*, but in looking at them recently, he came to the conclusion that they were two species under one name, and, upon looking the matter up, he found out that he had seven specimens which agreed with the description of *S. damnifica*—a species which is new to New Jersey. He also spoke upon the differences between the two species.

Professor Smith stated that both species were quite common to New Jersey.

Mr. Wenzel stated that at the last meeting Mr. Johnson said that recently diptera had been found in the ant's nest in Texas, and said he thought we ought to find specimens up in this district. The speaker showed two specimens of a *Phorid* taken from an ant's nest in a log at Frankford, September

8th, and, from his observations, thought that the flies must be parasitic. As soon as the nest was disturbed the flies started to run into the galleries, and the ants kept snapping at them. The flies seemed to be very common; as they crawled into the ants' galleries very rapidly; only two were taken.

Dr. Skinner showed the elytra and abdomen of a female of *Strategus antaeus* which had been given to him by Mr. A. E. Brown, of the Philadelphia Zoological Society, who stated that the parts shown had been passed by a water moccasin. Mr. Seiss said that he thought this could be explained by the fact that bullfrogs eat a great many insects, and a snake must have swallowed a frog which had eaten this specimen. Prof. Smith stated that the specimen was a female.

Mr. Wenzel reported from Chew's Landing, N. J., *Anthonomus disjunctus*, taken, September 6th, on a fall flower.

Mr. Daecke spoke about a lake which he had run across near Manumuskin, N. J., and stated that it seemed like a portion of Florida transferred to Jersey.

Prof. Smith spoke of the egg-laying habits of *Scudderia texensis* Sauss., the species which is destructive on cranberry bogs. It is found that eggs are deposited in the leaves of species of *Panicum*, preferably *viscidum* and, as a second choice, *dichotomum*. The ovaries contain from 12 to 15 tubes on each side, and, when first developing, each tube contains 5 almost equally developed egg-cells. The possibilities would therefore seem to be 150 eggs to an individual. As a matter of fact, only the lower egg in each tube develops, and 30 would seem to be the limit of ova deposited by a single individual. Egg-laying begins about the middle of September, and continues for nearly a month, the ova developing gradually in the individual. It is probable that six eggs placed at one time by one specimen comes nearer the limit.

In the general discussion on mosquitoes Prof. Smith states positively that more than one-third of all the specimens in South Jersey are *sollicitans*, the salt marsh species; that they may be blown or fly twenty miles or more inland, and that he has never found their larvæ at such points, though the adult females occurred in myriads; that even along shore where salt and fresh water merged *sollicitans* larvæ were never found in

fresh water, but were always found in great numbers where it became salty. The wates might be as salty as the sea itself, or more so; in fact, positive analysis of water in which larvæ were swarming showed from 20 to 25 per cent. more salt than normal sea water. Analyses were made at the New Jersey station and by Dr. E. G. Love, and they agreed practically in this point.

Larvæ of *Anopheles punctipennis* were also taken and bred in salt water from the Elizabethport meadows, though not in numbers. After a careful canvass of the State, he had found no relation whatever between the abundance of *Anopheles* and the prevalence of *malaria*. He did not wish to be understood as denying the connection between the two nor the necessity of *Anopheles* as an intermediate host; simply that the occurrence of *Anopheles* in large numbers does not necessarily mean that the district is a malarious one. There is a third factor involved which has not been recognized, and which must be determined before we can say that the subject is fully understood.

After the reading of the rough minutes, the meeting adjourned to the annex at 10.30 P.M.

W. H. REINICK, *Secretary*.

AN AUTHOR presents a paper before some society. He asks for a number of separates, usually one or two hundred copies. These are printed and sent him either gratuitously, or on payment of the additional expense incurred by the printer in changing the matter. Now on these, reference to the date and place of publication, and even the title of the publication itself may, one of the three, or all of them be omitted. Now what is the best course to pursue? Pitch the separates into the grate, or send them out and get scored for the lack of any one of these items more or less essential to the bibliographer?—F. M. WEBSTER.

SPHÆRIDIUM SCARABÆOIDES, Linn.—In Eastern Pennsylvania, on May 28th, while traversing a cleared area on the Lehigh Mountain near Bethlehem, which for many years has been a favorite browsing place for cows, I was reminded by favorable conditions present to look for *Sphæridium scarabæoides*. After a few examinations I was agreeably surprised to find a number of these active little beetles. Their presence here so soon after their discovery in New York State as recorded by R F. Pearsall and C. O. Houghton, seems to indicate that they are rapidly making their way southward.—G. W. CAFFREY, Bethlehem, Pa.